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Analysis of Profitability of BT Cotton Growers in District Multan-Pakistan

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Abstract
The study estimates the cost of production, yield, farm inputs, net revenue, economic and business profit of BT cotton cultivators in district Multan of Punjab province (Pakistan). This study uses the comprehensive survey from Multan district to analyze the profitability level by collecting data on different variables.The study shows that farmers grow BT cotton because it provides resistance against cotton bollworms infestations and gives higher yields. The study estimates the impacts of BT cotton adoption on producer benefits, returns and also adoption status which is classified into small, medium and large farmers.Economic profit and gross margin depict the farmer's economic conditions. In the study area large farmers of Multan district having more net revenue and gross margin as compared with Medium and small farmers of Multan district because of more inputs induction for the sake of more profitability. The analysis of Benefit Cost Ratio (BCR) depicts that BCR with imputed cost is less than one in all the cases i.e. small, medium and large while it is more than one without imputed cost. It means that farmers do not get profit if imputed cost is included in total cost. BCR is highest for small farmers followed by large farmers in case of without imputed cost estimation. It may be due to engagement of all family members in all the operations of crop cultivation. So they save labor expenses.
Keywords: Gross margin, Net Revenue, Economic Profit, Yield, Business Profit, BCR.

Introduction

Agriculture sector is the 2nd largest sector of Pakistan contributing 21.4 percent share in GDP, which is absorbing 43.7% of total labor force while growth rate in agriculture sector is 2.1 percent in (2013-14) and 2.9 percent in (2012-13). Agriculture is the back bone of Pakistan's economy due to its large share. Agriculture sector is classified into two further sectors, i.e. farming and non-farming sectors. Farming sector is divided into cotton, wheat, rice, sugar cane and minor crops. In (2012-13) cotton production in Pakistan was 13031 thousand bales while in (2013-14) it has declined to 12769 thousand bales due to natural climates, which is 4.2 percent (GOP, 2014).

Cotton is cultivated in more than 70 countries of the world however only four countries are dominant USA, China, Pakistan and India which are producing two-third of the world's cotton. China is the largest cotton producer which is producing 25% cotton of the world. USA is the second largest which is producing 19% cotton of the world, while India is on the third with 14% and Pakistan is on fourth with 9% cotton production of the world . USA is the main cotton exporter of the world as it exports 41% of the world's cotton exports and China is the main cotton importer as it imports 19% of the world's cotton imports. (Sabir et al. 2011)

Cotton is the important 'kharif Crop' which is one of the main sources of raw material of textile industry. 26% farmers of Pakistan are cotton growers who are growing on 15 percent (3 million hectors) of the total cultivated area. Cotton is primarily cultivated in two provinces of Pakistan; Punjab and Sindh. Punjab is cultivating 80% while sindh is cultivating 20% of the total cotton production. Cotton and its products are contributing 8% of GDP, 17% of employment and 54% of foreign exchange earnings of the Pakistan. (Cororaton & Orden, 2010)

To overcome problems of cotton, BT cotton was adopted in recent years, firstly it was discovered in 1901 by a Japanese biologist Ishiwata Shigetance. BT (Bacillus Thuringiensis) was re-discovered in 1911 by Germans. But at that time it was not as appreciated as it is now days. Now a days it is widely cultivating by different developed and developing countries of the world on 7.2 million hectors and these countries confirm remarkable results in the reduction of pesticides, insects, bollworms, fertilizers and increased in per acre yield. (James, 2010)

BT cotton is one of the miracles which create in-built mechanism of resistance against pests species especially bollworms which are the main damaging factors of cotton. Currently it is cultivated throughout the world for commercial purpose specially; Pakistan, India, China, United States, Mexico, Australia, South Africa, Argentina and Columbia. Many other countries want to adopt genetically modified cotton but they are still observing the results of these varieties in the adopter's countries. (Qaim and Zilberman, 2003)

In the past, BT cotton was banned in Pakistan for commercial purpose because of its some draw backs; food security, employment, cotton leaf curl virus (CLCV) & mealy bug. Currently the government of Pakistan,

Punjab Seed Council, Federal Seed Certification and Registration department approved BT varieties for commercial purpose in Pakistan. On 23rd may 2013, Punjab Seed Council approved 15 new BT-cotton varieties which show that the government of Pakistan is now taking interest in genetically modified cotton. (Business Recorder, 2013)

Genetically modified cotton varieties have been changed the scenario of agriculture sector regarding yield, income, lifestyle etc. BT cotton cultivation is rapidly increased from 60% to 75% in Punjab while almost 80% in Sindh. (Ashfaq et al., 2012)

BT cotton has great economic benefits as compared to non BT cotton varities. The researchers described that the use of BT cotton can reduce pesticide poisoning, labour cost and pest damages. So due to increase in these aspects the prosperity of farmers can be enhanced.(Miriti et al. 2013)

Number of empirical studies such as Javed et al. (2006); Nazli et al. (2012); Dev&Rao (2007); Abid et al. (2011); Ashfaq et al. (2012); Herring (2013); Nazli et al. (2011); Moras&Manian (2008); Huang et al. (2001); Eyhorn et al. (2005) have also concluded significant impacts of BT cotton cultivation on cost and profitability of growers.

Main Research Problem

The main research problem of this study is to analyze the profitability of BT Cotton Growers in District Multan-Pakistan

Objectives of Study

Followings are the main objectives of this study

1. To estimate the cost of production of Bt growers in study area.
2. To estimate the net revenue and gross margin of BT cotton growers.

Literature Review

Research Methodology

Data

Primary data are collected for this study. stratifiedsampling technique has been employed for data collection. From Multan district two tehsils; Multan and ShujaAbad are selected and from each tehsil 5 village are taken randomly. From each village a sample of 8farmers comprising of small (farmers having land <12 acres) ,medium(≥ 12 but < 25 acres) and large farmers (farmers having land ≥25 acres) are selected randomly. Three small, three Medium &two Large farmers from each village of Multan and Shujabad tehsils were taken.

Statistical Tool

Descriptive analysis is used to analyze the collected data in this paper. Cost of production of Bt cotton is measured by adding the ploughing, leveling, seed bed preparation, seed cost, sowing cost, farm yard manure (FYM) cost, fertilizer cost, irrigation cost, hoeing and thinning cost, pesticides cost, total picking cost, harvesting of sticks cost, land revenue to be paid cost (abiana+ maliana), management charges and land rent.

In the calculation of 'imputed cost' all implicit or opportunity cost is included while in the calculation of 'without imputed cost' all explicit costs are calculated.

Per acre total revenue (TR), gross margin, economic profit and business profit are calculated. The formulas of calculating TR, gross margin, economic profit and business profit are as under;

Total revenue (TR) = output produced per acre * price of output .

Gross margin (GM)=TR- Total Variable cost (TVC)

Economic profit = TR – [explicit cost + implicit cost]

Business profit = TR – [explicit cost]

Benefit cost ratio(BCR)= Economic profit/TC (When imputed cost is taken)

Benefit cost ratio (BCR)= Business profit/TVC (When imputed cost is not taken)

Findings and Results

Table 1 (a) & (b) show the per acre cost of production with imputed cost and without imputed cost respectively for small farmers in district Multan. Per acre cost of production with opportunity cost is estimated Rs. 69552 while it is Rs. 41233 without imputed cost for small farmers in district Multan.

In case of medium farmers per acre average cost of production with imputed and without imputed cost is calculated as Rs. 81745 and Rs. 52619 respectively. While large farmers cost of production with and without imputed cost has been estimated Rs. 84545 and Rs. 61965 respectively.

Analysis reveals that average cost of production is highest on larger farmers followed by medium farmers. It is obvious as larger farmers usually do not face the problem of credit availability for the use of inputs on their lands. It has been observed that small farmers have to face the problem of financial constraints for the purchase of necessary inputs. Small farmers have to face the problem of both affordability and accessibility.

Table 1

(a)

Per acre cost of production of BT Cotton in Multan District (Small farmers) with Imputed Cost (in Rupees)	
Ploughing cost	3412
Leveling cost	1112
Seed Bed preparation cost	1173
Seed Cost	2057
Sowing cost	636
FYM Costand application charges	1943
Fertilizerand application charges	9948
Irrigationand application charges	5525
Hoeing &Thining	1838
Pestisidesand application charges	7930
T.Picking Cost	14817
Harvesting of Sticks	1030
Labor cost	2643
Land Revenue (Aabiana+Maliana)	105
Land Rent	15383
Per acre cost of Prouction	69552

(b)

Per acre cost of production of BT cotton in Multan District (Small farmers) without Imputed Cost(in Rupees)	
Ploughing cost	3022
Leveling cost	1112
Seed Bed preparation cost.	1042
Seed Cost	2057
Sowing cost	636
FYM Cost	0
Fertilizer	7948
Irrigation	4384
Hoeing &Thining	0
Pestisides	5930
T.Picking Cost	14197
Harvesting of Sticks	0
Labor cost	0
Land Revenue (Aabiana+Maliana)	105
Land rent	0
Per acre cost of Prouction	41233

Table 2

(a)

Per acre cost of production of BT Cotton in Multan District (Medium farmers) with Imputed Cost (in Rs)	
Ploughing cost	3606
Leveling cost	1384
Seed Bed preparation cost	1216
Seed Cost	1959
Sowing cost	670
FYM Cost&application charges	742
Fertilizer& application charges	9689
Irrigatio& application charges	11797
Hoeing &Thining cost	2477
Pestisides cost& application charges	10144
T.Picking Cost	13456
Harvesting of Sticks	995
Labor cost	2800
Land Revenue (Aabiana+Maliana)	111
Management Charges	2086
Land Rent	18613
Per acre cost of production	81745

(b)

Per acre cost of production of BT Cotton in Multan District (Medium farmers) with out Imputed Cost (in Rs)	
Ploughing cost	2804
Leveling cost	1371
Seed Bed preparation cost	853
Seed Cost	1959
Sowing cost	670
FYM Cost	600
Fertilizer	7688
Irrigation	10486
Hoeing &Thining cost	2477
Pestisides	8144
T.Picking Cost	13456
Harvesting of Sticks	0
Labor cost	2000
Land Revenue (Aabiana+Maliana)	111
Management Charges	0
Land Rent	0
Per acre cost of production	52619

Table 3

(a)

Per acre cost of production of BT Cotton in Multan District (Large farmers) with Imputed Cost (in Rs)	
Ploughing	4001
Leveling	1672
Seed Bed preparation cost	1234
Seed Cost	2178
Sowing charges	669
FYM Cost& application charges	130
Fertilizer cost and application charges	9270
Irrigation cost &application charges	12343
Hoeing &Thining	2197
Pestisides and application charges	9541
T.Picking Cost	16831
Harvesting of Sticks	999
Labor cost	4350
Land Revenue (Aabiana+Maliana)	102
Management Charges	2188
Land Rent	16840
Per acre cost of Proudction	84545

(b)

Per acre cost of production of BT Cotton in Multan District (Large farmers) without Imputed Cost (in Rs)	
Ploughing	2263
Leveling	1313
Seed Bed preparation cost	778
Seed Cost	2178
Sowing charges	669
FYM Cost	130
Fertilizer cost & application charges	9270
Irrigation& application charges	12343
Hoeing &Thining	2197
Pestisides& application charges	9541
T.Picking Cost	16831
Harvesting of Sticks	0
Labor cost	4350
Land Revenue (Aabiana+Maliana)	102
Management Charges	0
Land Rent	0
Per acre cost of production	61965

Table 4

(a)

Per acre TR, Gross margin & Economic profit of BT Cotton in Multan District (Small farmers) with Imputed Cost (in Rs)	
Per acre yield (in maund)	40.5
Average rate/maund	2850
TR	115425
Av. Variable cost	51526
Gross Margin	63899
Eco Profit	45873
BCR	0.66

(b)

Per acre TR, Gross margin & Economic profit of BT Cotton in Multan District (Small farmers) without Imputed Cost (in Rs)	
Per acre yield (in maund)	40.5
Average rate/maund	2850
TR	115425
Av.variable cost	41233
Gross Margin	74192
Business Profit	74192
BCR	1.79

Benefit Cost Ratio has been estimated for all categories. Benefit cost ratio (BCR) takes into account the amount of monetary gain realized by performing an economic activity versus the amount it costs to execute the economic activity. The higher the BCR the better the investment is. General rule of thumb is that if the benefit is higher than the cost the project is a good investment. Table 4, 5 and 6 reveals that benefit cost ratio BCR with imputed cost is less than one in all the cases i.e. small, medium and large while it is more than one without imputed cost. It means that farmers do not get profit if imputed cost is included in total cost. BCR is highest for small farmers followed by large farmers. It may be due to engagement of all family members in all the operations of crop cultivation. So they save labor expences.

Table 5

(a)

Per acre TR, Gross margin & Economic profit of BT Cotton in Multan District (Medium farmers) with Imputed Cost (in Rs)	
Per acre yield (in maund)	**41**
Average rate/maund	**2850**
TR	116850
Av. Variable cost	58246
Gross Margin	58604
Eco Profit	35105
BCR	0.43

(b)

Per acre TR, Gross margin & Business profit of BT Cotton in Multan District (Medium farmers) without Imputed Cost (in Rs)	
Per acre yield (in maund)	**41**
Average rate/maund	**2850**
TR	116850
Av. Variable cost	50619
Gross Margin	66231
Business Profit	64231
BCR	1.27

Table 6

(a)

Per acre TR, Gross margin & Economic profit of BT Cotton in Multan District (Large farmers) with Imputed Cost (in Rs)	
Per acre yield (in maund)	**56**
Average rate/maund	**2850**
TR	159600
Av. Variable cost	61167
Gross Margin	98433
Eco Profit	75055
BCR	0.89

(b)

Per acre TR, Gross margin & Business profit of BT Cotton in Multan District (Large farmers) without Imputed Cost (in Rs)	
Per acre yield (in maund)	**56**
Average rate/maund	**2850**
TR	159600
Av. Variable cost	57615
Gross Margin	101985
Business Profit	97635
BCR	1.69

Conclusion and Recommendations:

Agriculture sector is the backbone for the economy of Pakistan as it is the second largest sector of the economy. In the agrarian sector cotton having the prime importance and in it Bt cotton have brought a supporting grooming of farmers in the yield, revenue, profit rates and decrease in cost of production.

In our study area of Multan cost of production of large farmers is quite high as compared with small and medium farmers. It is high because of more use of inputsby large farmers in Multan district. Economic profit and gross margin depict the farmer's economic conditions. In the study area small farmers of Multan district having more revenue, gross margin economic profit and business profit as compared with medium farmers.Large farmers of Multan district having more total revenue, gross margin, economic profit and also business profit as compared with small and medium farmers.

Moreover, table 4, 5 and 6 reveals that BCR with imputed cost is less than one in all the cases i.e. small, medium and large while it is more than one without imputed cost. It means that farmers do not get profit if imputed cost is included in total cost. BCR is highest for small farmers followed by large farmers. It may be due to engagement of all family members in all the operations of crop cultivation. So they save labor expenses. Moreover, BCR with imputed cost shows that it is less than one which indicates that farmers actually not getting the return of its all efforts which they put forward in raising the cotton crop. It may be due to many factors such as low average yield, high inputs cost, sub-standard inputs, and low prices of their product as compare to international prices. Therefore, in order to further increase in yield of Bt cotton especially small and medium farmers the above factors must be rectified along with the availability and accessibility of modern technology is

required. Availability of credit to small farmers is limited. Therefore, its availability to small and medium farmers must be ensured by removing procedural complexities so that farmers could avail this facility for timely purchase of inputs.

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